

Penicillinase-producing *Neisseria gonorrhoeae* among prostitutes in Surabaya

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SUMMARY Thirty-six strains of penicillinase-producing *Neisseria gonorrhoeae* (PPNG) were detected among 794 prostitutes between October 1981 and May 1982 in Surabaya, Indonesia. The high prevalence of PPNG strains among the high-class prostitutes and a lower prevalence among the low-class suggest that regular mass treatment for syphilis did not play an important role in the emergence and spread of PPNG; the importation of PPNG strains from abroad is more likely to have been responsible.

Introduction

Since the discovery of penicillinase-producing strains of *Neisseria gonorrhoeae* (PPNG) in 1976 in England and in the USA,¹ infections with PPNG strains have been reported from many countries. The indiscriminate and suboptimal use of the penicillins may have caused and maintained the existence of PPNG strains.^{2,3} The first cases of PPNG infections in Indonesia were reported from Jakarta in 1980 and from Surabaya in 1981.⁴

Culture for *N. gonorrhoeae* is not performed routinely in Indonesia and contact tracing of infected individuals is not undertaken. As prostitutes are the major source of sexually transmitted diseases in Indonesia annual screening of these women is important in assessing the spread of PPNG strains in the community. About 85% of patients with gonorrhoea and non-gonococcal urethritis attending health centres in Surabaya named prostitutes as their source of infection.⁵

There are three classes of prostitute in Surabaya: the high-class, the local, and the clandestine prostitutes. The local prostitutes are the largest group, numbering about 5000; they live and operate in four districts and are registered semi-officially with the police. Socioeconomically they belong to the lower and middle classes. About 400 women who operate in two different streets in two districts have a much higher standard of living, demand a higher fee,

and can be classified as high-class local prostitutes; their clients are usually middle-class men. Since 1958 compulsory regular mass treatment consisting of a weekly injection of 900 000 units of penicillin in oil has been given to the local prostitutes. This has effectively lowered the incidence of syphilis among prostitutes. Serological tests for syphilis were positive in the sera of 86.6% of female prostitutes in 1955; at present only 4% have treponemal antibodies in their serum.^{5,6}

High-class prostitutes consist of call-girls operating in several private houses and girls working in massage parlours. Their clients are mostly upper middle-class men of the local community and foreigners. The call-girls attend their own doctors irregularly whereas the massage girls are examined weekly by the company doctors who examine Gram-stained vaginal smears. There are about 300 high-class prostitutes and they frequently treat themselves.

The clandestine prostitutes are low-class women who operate on the streets during the night; their clients are usually from the lower classes of the community. Twice a month they are treated with 2.4 million units of benzathine penicillin.

Several surveys among these prostitutes in 1976, 1977, and 1979 failed to detect PPNG strains.⁷ After three cases of PPNG infection in Surabaya were reported⁴ a survey of gonococcal infection among prostitutes was undertaken in 1981.

Patients and methods

Between October 1981 and May 1982, 694 prostitutes were examined for infection with *N. gonorrhoeae*. Of these, 133 were call-girls, 107 massage girls, 268 local

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prostitutes, 100 high-class local prostitutes, and 86 clandestine prostitutes. The 368 local prostitutes were selected at random from all the red light districts. The clandestine prostitutes were examined after being taken from the streets by the local authorities. The call-girls and massage girls attended for routine examination (see above).

Material for culture was taken from the urethra, the cervix, the pharynx, and the rectum in each woman. The specimens were inoculated directly on to modified Thayer-Martin medium (Oxoid, UK) and incubated in a candle jar at 37°C for 48 hours. *N gonorrhoeae* was identified by colonial morphology, microscopic examination of Gram-stained smears, oxidase reaction, and sugar fermentation tests.^{8,9} The penicillin sensitivity of each isolate was tested by the disc diffusion method using a 10-unit penicillin G disc. When micro-organisms showed resistance to penicillin G they were tested for penicillinase production by the starch-iodine test.^{1,2}

Results

Of the 694 prostitutes, 266 (38.3%) were infected with *N gonorrhoeae*: the number infected with PPNG strains are given in table I and the sites from which the strains were isolated in table II. All strains of PPNG were resistant to penicillin G.

TABLE I No of prostitutes infected with penicillinase-producing *N gonorrhoeae* (PPNG) strains

Group	Total No	No with gonorrhoea	No infected with PPNG strains
Call-girls	133	46	11
Massage girls	107	28	4
Local prostitutes	268	122	6
High-class local prostitutes	100	45	15
Clandestine prostitutes	86	25	0

TABLE II Sites of infection with *N gonorrhoeae*

Sites	No (%) of women with positive cultures	No (%) of isolates producing penicillinase
Pharynx	65 (9.4)	3 (4.6)
Rectum	80 (11.5)	8 (10.0)
Urethra	144 (20.8)	19 (13.2)
Cervix	136 (19.6)	25 (18.3)
Total	425 (46.8)	55 (16.9)

Discussion

Regular mass treatment has been the policy for the control of syphilis in Indonesia since 1957. Those who opposed this policy argued that although this had reduced the incidence of syphilis it might increase the resistance of *N gonorrhoeae* to penicillin if it was given in suboptimal doses. As strains of PPNG have been identified in many countries around Indonesia it was feared that regular mass treatment might produce an increase in the prevalence of PPNG infections among the local prostitutes. The absence of PPNG in the prostitutes in the 1976, 1977, and 1979 surveys compared with the present results, which showed a high prevalence of PPNG among the high-class prostitutes and the high-class local prostitutes and a low prevalence among the general local prostitutes, suggested that regular mass treatment did not precipitate the spread of PPNG. A more likely explanation for the increased prevalence of PPNG among the high-class prostitutes is the importation of PPNG strains from abroad. As penicillin has been the treatment of choice in the health centres in Surabaya the discovery of PPNG strains among the prostitutes has created a problem in the treatment of gonorrhoea. Further studies are needed to assess the effect of epidemiological treatment of prostitutes and the recommendation for the treatment of gonorrhoea will require revision.

References

1. World Health Organisation. *Neisseria gonorrhoeae* producing penicillinase. *WHO Weekly Epidemiological Record* 1976;51: 293-4.
2. World Health Organisation. *Neisseria gonorrhoeae* producing β -lactamase (penicillinase). *WHO Weekly Epidemiological Record* 1976;51:385-6.
3. World Health Organisation. *Neisseria gonorrhoeae* producing β -lactamase (penicillinase). *WHO Weekly Epidemiological Record* 1977;52:357-9.
4. Soendjojo A, Idajadi A, Barakbah J, Ilias MI. Penicillinase-producing *Neisseria gonorrhoeae* isolated in Surabaya. *Br J Vener Dis* 1981;57:376-7.
5. Surabaya Municipality Health Service. *Annual Report* 1979/80.
6. CDC Directorate General. *Prevention and Control of Venereal Diseases*. Republic of Surabaya: Ministry of Health, 1970.
7. Antimicrobics Investigation Section, Center for Disease Control. *Rapid Laboratory Tests for Beta-lactamase Production by Bacteria*. Washington DC: US Department of Health, Education and Welfare, 1977.
8. Douglas S, Kellogg JR. *Neisseria gonorrhoeae* (gonococcus). In: Lennette EH, Spaulding EH, Truant JP, eds. *Manual of Clinical Microbiology*, 2nd ed. Washington DC: American Society for Microbiology, 1974:124-9.